



Heads Up for Soybean Rust

Four years ago, it was found lurking on soybeans growing on the Hawaiian island of Oahu. And some U.S. plant pathologists believe it's only a matter of time before this devastating fungus gets to the continental United States—hitchhiking on a traveler's clothing or in cargo or blown on the wind.

It's the Asian species of soybean rust, known formally as *Phakopsora pachyrhizi*. And its potential for damage is enormous.

At a 1995 workshop convened to propose a plan for controlling a possible invasion of *P. pachyrhizi*, U.S. experts estimated that the fungus could cut soybean yields by more than 10 percent anywhere in the country. In the warm, moist Southeast, it could cause losses of up to 50 percent. In addition to soybeans, *P. pachyrhizi* naturally infects 31 legume species in 17 different genera. One of those plants is kudzu—a common weed pest in the Southeast—which might serve as a continual source of inoculum.

"All you need is one spore," says ARS plant pathologist Morris R. Bonde. Under the right environmental conditions, it could produce trillions of spores within weeks." Bonde was one of the experts at the workshop sponsored by the University of Illinois' National Soybean Research Laboratory.

Bonde is also one of the first U.S. scientists to study soybean rust, starting in 1974 when he joined ARS' Foreign Disease/Weed Science Research Unit in Frederick, Maryland. He says it was one of three foreign diseases the agency deemed necessary to prepare for.

He worked with the late Edgar E. Hartwig, an ARS soybean breeder in Stoneville, Mississippi, who developed some breeding lines with resistance to soybean rust. But as time passed and the virulent Asian species remained on the other side of the globe, interest waned.

Now Bonde and molecular biologist Reid D. Frederick and biologist Gary L. Peterson are gearing up this research. Bonde says there's a need for more germplasm with strong resistance to soybean rust. So he's searching for a laboratory method to rapidly evaluate wild germplasm and breeding lines that accurately reflects how the plants would react to the fungus in the field.—By **Judy McBride**, ARS.

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No Ants Allowed!

Two kinds of ants are surprisingly troublesome and costly invaders of our homes, yards, and parks.

Fire ants infiltrate traffic signals, electrical switch and telephone boxes, and air conditioners, creating a need for costly replacements, while pharaoh ants are more likely to migrate into warm buildings. Fire ants alone have caused over half a billion dollars in damage costs and control efforts since they entered the United States at the turn of the century.

Now, after studying the ants' behavior, Agricultural Research Service chemist Robert Vander Meer has found a nontoxic way to stop their invasive habits. He discovered and patented several noninsecticidal ant repellents—the first of their kind.

Vander Meer is in ARS' Center for Medical, Agricultural, and Veterinary Entomology's Imported Fire Ant and Household Insects Research Unit at Gainesville, Florida.

The repellents are volatile chemicals with a high vapor pressure that evaporate rapidly into the air. Laboratory tests show that combining the repellents with a slow-release material, such as powdered corn starch, will extend the repellent's active life in the field up to a year.

"The repellents are ideal alternatives to insecticides, especially in state or national parks and other areas where their use is limited—or even prohibited—because of possible human contact," says Vander Meer. "The repellents are a way to keep the ants at bay, so to speak. When applied, they inhibit foraging and keep ants underground."

Fire ants infest an estimated 278 million acres in 11 southern states and Puerto Rico. Known for their burning sting, they bother about 30 percent of the population within infested areas each year.

Pharaoh ants, on the other hand, are urban dwellers and cause most trouble indoors. They are a worldwide pest, occurring in temperate and tropical climates. During cold winter months, in northern states, the pharaoh ants take up residence in buildings and homes.

Vander Meer says the next appropriate step would be to test the repellents' effects on other ant species. "We are currently studying their effects on the Argentine ant, which is also a pest worldwide," he says.—By **Tara Weaver**, ARS.

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